PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

		•	:
Applicant's or agent's file reference CDK2175	FOR FURTHER A	CTION	See Form PCT/IPEA/416
International application No. PCT/GB2004/002656	International filing date 21.06.2004	(day/month/year)	Priority date (day/month/year) 20.06.2003
International Patent Classification (IPC) or na C02F1/50, A01N61/00, A01N57/34	ational classification and l	PC	
Applicant RHODIA CONSUMER SPECIALTIE	ES LIMITED et al.		
This report is the international pre- Authority under Article 35 and trans	liminary examination re esmitted to the applican	port, established by this taccording to Article 36	s International Preliminary Examining 3.
2. This REPORT consists of a total of	of 6 sheets, including the	nis cover sheet.	
3. This report is also accompanied b	y ANNEXES, comprisir	ng:	
a. 🗵 sent to the applicant and to	the International Bure	au) a total of 8 sheets.	as follows:
	on, claims and/or drawing rectifications authori	ngs which have been a	mended and are the basis of this report see Rule 70.16 and Section 607 of the
☐ sheets which supersed beyond the disclosure Supplemental Box.	le earlier sheets, but w in the international app	hich this Authority cons lication as filed, as indi	iders contain an amendment that goes cated in item 4 of Box No. I and the
b. (sent to the International Basequence listing and/or tab Box Relating to Sequence	les related thereto, in c	omputer readable form	or of electronic carrier(s)) , containing a only, as indicated in the Supplemental instructions).
4. This report contains indications re	lating to the following it	ems:	
Box No. I Basis of the opin	nion		
☐ Box No. II Priority			
☑ Box No. III Non-establishme	ent of opinion with rega	rd to novelty, inventive	step and industrial applicability
☐ Box No. IV Lack of unity of i	-	•	
⊠ Box No. V Reasoned state applicability; cita	ment under Article 35(2 ations and explanations	with regard to novelty supporting such staten	, inventive step or industrial nent
☐ Box No. VI Certain docume	nts cited		
☐ Box No. VII Certain defects i	in the international app	lication	
☐ Box No. VIII Certain observa	tions on the internation	al application	
Date of submission of the demand		Date of completion of thi	s report
			- 10
20.04.2005		07.10.2005	
Name and mailing address of the international preliminary examining authority:	al	Authorized Officer	abliches Palantage.
European Patent Office D-80298 Munich		Serra, R	is. • • • • • • • • • • • • • • • • • • •
Tel. +49 89 2399 - 0 Tx: 52369 Fax: +49 89 2399 - 4465	56 epmu d	Telephone No. +49 89 2	399-5976

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No. PCT/GB2004/002656

	Box No. I	Basis of the report	
1.	With regard	ed to the language , this report is based on the as otherwise indicated under this item.	international application in the language in which it was
	☐ This rewhich	eport is based on translations from the origina is the language of a translation furnished for t	language into the following language , he purposes of:
	☐ pul	ernational search (under Rules 12.3 and 23.1(blication of the international application (under ernational preliminary examination (under Rule	Rule 12.4)
2.	have been	rd to the elements* of the international applica of furnished to the receiving Office in response foriginally filed" and are not annexed to this re	tion, this report is based on (replacement sheets which to an invitation under Article 14 are referred to in this port):
	Description	n, Pages	
	1-20	as originally filed	
	Claims, Nu	ımbers	
	1-42	filed with telefax on 25.05	.2005
	Drawings, S	Sheets	
	1/4-4/4	as originally filed	
	□ a sequ	uence listing and/or any related table(s) - see	Supplemental Box Relating to Sequence Listing
3.	☐ The ar	mendments have resulted in the cancellation	of:
		e description, pages e claims, Nos.	. •
	☐ the	e drawings, sheets/figs	
		e sequence listing <i>(specify)</i> : y table(s) related to sequence listing <i>(specify)</i> :	
4.	had not be	eport has been established as if (some of) the een made, since they have been considered to ntal Box (Rule 70.2(c)).	amendments annexed to this report and listed below go beyond the disclosure as filed, as indicated in the
	☐ the ☐ the	e description, pages e claims, Nos. e drawings, sheets/figs	
		e sequence listing <i>(specify)</i> : y table(s) related to sequence listing <i>(specify)</i> :	
	* Tf i+	tem 4 applies some or all of thes	a shoots may be marked "synorgoded "

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No. PCT/GB2004/002656

		c No. III Non-establishment o dicability	of op	inion with regard to novelty, inventive step and industrial
1.	The	questions whether the claimed ious), or to be industrially applic	inve able	ntion appears to be novel, to involve an inventive step (to be non- have not been examined in respect of:
		the entire international applicat	ion,	
	\boxtimes	claims Nos. 40-42		
		because:		
		the said international application not require an international pre	n, or Iimin	the said claims Nos. relate to the following subject matter which does ary examination (specify):
		the description, claims or draw that no meaningful opinion cou	ings Id be	(indicate particular elements below) or said claims Nos. are so unclear formed (specify):
		the claims, or said claims Nos. could be formed.	are s	so inadequately supported by the description that no meaningful opinion
	×	no international search report h	nas b	een established for the said claims Nos. 40-42
		the nucleotide and/or amino ac C of the Administrative Instruct	id se ions	quence listing does not comply with the standard provided for in Annex in that:
		the written form		has not been furnished
				does not comply with the standard
	•	the computer readable form	· 🗀	has not been furnished
				does not comply with the standard
		the tables related to the nucleo not comply with the technical re	tide a equire	and/or amino acid sequence listing, if in computer readable form only, do ements provided for in Annex C-bis of the Administrative Instructions.
		See separate sheet for further	detai	ls.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No. PCT/GB2004/002656

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	Вох	No. IV	Lack of unity of inv	ention	1	
1.		☐ restrict ☐ paid a ☐ paid a	nse to the invitation to cted the claims. additional fees. additional fees under er restricted nor paid a	protest	·.	itional fees, the applicant has:
2.		This Autl Rule 68.	hority found that the r 1, not to invite the app	equirer olicant	ment of unity to restrict or	of invention is not complied with and chose, according to pay additional fees.
3.	This	S Authority	y considers that the re	equiren	nent of unity	of invention in accordance with Rules 13.1, 13.2 and 13.3
		complied	l with.			
	Ø	not comp	olied with for the follow	wing re	asons:	
		see sepa	arate sheet			·
4.	Con	sequently	, this report has beer	n estab	lished in res	pect of the following parts of the international application:
		all parts.				
	Ø	the parts	relating to claims No	s. 1-39).	
					-	
		No. V licability	Reasoned statemer ; citations and expla	nt undenation	er Article 35 ns supportin	(2) with regard to novelty, inventive step or industrial g such statement
1.	Stat	ement				
	Nov	elty (N)		Yes: No:	Claims Claims	11-14, 36-39 1-10 15-35
	Inve	entive ster	o (IS)	Yes: No:	Claims Claims	1-39
	Indu	istrial app	licability (IA)	Yes: No:	Claims Claims	1-39
2.	Cita	tions and	explanations (Rule 7	0.7):		

see separate sheet

Re Item IV.

As a consequence of the lack of unity between claims 1- 10 and 11-39 mentioned in the communication attached to the partial search report and the fact that the further search revealed further prior art that gives evidence of a further lack of unity "a posteriori" within the group of claims 11-39. No form 405 was issued because of the impending limit dates.

Re Item V.

- 1 The following documents are referred to in this communication:
 - D1: GB-A-1 221 550 (HOECHST AG) 3 February 1971 (1971-02-03)
 - D2: EP-A-1 080 641 (NALCO CHEMICAL CO) 7 March 2001 (2001-03-07)
 - D3: WO 99/33345 A (JONES CHRISTOPHER RAYMOND; ALBRIGHT & WILSON UK LTD (GB); TALBOT ROBE) 8 July 1999 (1999-07-08)
 - D4: US-A-4 673 509 (DAVIS KEITH P ET AL) 16 June 1987 (1987-06-16)
- 1.1 Document D1 discloses (example 2) the use of dinitro phenol (2,4, dinitro phenol is an uncoupling agent as described by the applicant), in an amount of 5 mg/l for controlling biomass in an aqueous system and is therefore suitable for use in an aqueous system.
- 1.2 Document D2 discloses (paragraphs 2, 22 and 23, claim 15) the use of tetrakis hydroxy methyl phosphonium sulphate (that is an uncoupling agent corresponding with the formulas I and III of claim 15 of the present demand), in combination with another biocide and surfactants, for controlling biological growth in an industrial aqueous system.
- 1.3 Document D3 discloses (claims 1 and 10) the use of "THP" together with a condensate of THP and dicyandiamide, where "THP" indicates tetrakis (hydroxy methyl) phosphonium salts together with their parent base, tris (hydroxy methyl) phosphine as (that is an uncoupling agent corresponding with the formulas I, II and III of claim 15 of the present demand), in combination with surfactants, for controlling biological growth in an industrial aqueous system.
- 1.4 Document D4 discloses (claims 1 and 4) the use of tetrakis (hydroxy methyl) phosphonium sulphate, chloride or phosphate (that is an uncoupling agent corresponding with the formulas I and III of claim 15 of the present demand), for controlling biological growth in an industrial aqueous system. Where 1-1000 ppm

of biocide is used (claim 7)

2 INDEPENDENT CLAIM 1

2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT.

2.2 DEPENDENT CLAIMS 2-23

Dependent claims 2-10, 15-23 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and inventive step (Article 33(2) PCT).

3 INDEPENDENT CLAIM 24

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 24 is not new in the sense of Article 33(2) PCT.

4 INDEPENDENT CLAIM 25

4.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 25 is not new in the sense of Article 33(2) PCT.

4.2 DEPENDENT CLAIMS 26-39

Dependent claims 26-39 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty or inventive step (Article 33(2) PCT).

CLAIMS

- 1. The use of a water-soluble biocide as an uncoupling agent at an effective amount to control bacterial biomass in an aqueous system. Which he biocide is snikable for the in aqueous for due to the having her him have been a water-soluble biocide as an uncoupling agent as claimed in claim 1 in which the effective amount of the uncoupling agent is up to 5000 mg/l.
- 3. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 2 in which the effective amount of the uncoupling agent is up to 3000 mg/l.
- 4. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 3 in which the effective amount of the uncoupling agent is up to 1000 mg/l.
- 5. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 4 in which the effective amount of the uncoupling agent 20 is from 0.005mg/l to 500mg/l.
 - 6. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 5 in which the effective amount of the uncoupling agent is from 0.01mg/l to 300mg/l.

7. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 6 in which the effective amount of the uncoupling agent is from 0.05mg/1 to 100mg/1.



- 8. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 3 in which the effective amount is from 0.1mg/l to 10mg/l.
- 5 9. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 8 in which the effective amount of the uncoupling agent is from 0.5mg/l to 7.5mg/l.
- 10. The use of a water-soluble biocide as an uncoupling agent as 10 claimed in claim 9 in which the effective amount of the uncoupling agent is from 1mg/l to 5mg/l.
- 11. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 1 in which the effective amount of the uncoupling agent
 15 is from 0.1mg to 10000mg per gram of sludge solids in the aqueous system.
- 12. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 11 in which the effective amount of the uncoupling agent 20 is from 0.5mg to 1000mg per gram of sludge solids in the aqueous system.
- 13. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 12 in which the effective amount of the uncoupling agent
 25 is from 1mg to 500mg per gram of sludge solids in the aqueous system
 - 14. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 13 in which the effective amount of the uncoupling agent is from 5mg to 100mg per gram of sludge solids in the aqueous system.



15. The use of a water-soluble biocide as an uncoupling agent as claimed in any one of the preceding claims in which the water-soluble biocide comprises an alkyl substituted phosphonium compound of formula (I) or an alkyl substituted phosphine of formula an alkyl-substituted phosphine of formula (II) and a condensate of formula (III):

$$\begin{bmatrix} A & R_2C & A \\ R_2C-P-CR_2 & R_2C & A \end{bmatrix}_n + X^m - R_2C-P-CR_2 - R_2C - A$$
(I)
(II)

. 10

 $(AR_2CR^1, P[R']^2R^1,]_{\kappa}CR_2A)^{\kappa}$

(III)

15

wherein:

X is an anion;

n is the valency of X represented by m;

each A can be the same or different and is selected from OH, OR, SO3R,

20 PO₃R₂, COOH, COOR, SO₃H, PO₃H₂, CH₂COOH, substituted alkyl, aryl and substituted amino groups;



each R, and each R in each A group, is independently selected from hydrogen, a C₁ to C₂₀ alkyl, aryl, substituted alkyl or aryl, carboxy or carboxy ester; wherein each CR₂ group may be the same or different, and

R" is a divalent hydrocarbon radical having from 2-20 carbon atoms and is optionally substituted with one or more substituents selected from the group consisting of halogen, hydroxy, carboxy, amino, alkylamino, or PR1mCH2OH groups or interrupted by one or more ether or carbonyl linkages;

10

each R¹ is independently a monovalent hydrocarbon radical having from 1 to 25 carbon atoms and optionally substituted with one or more substituents selected from the group consisting of halogen, hydroxy, carboxy, amino, alkylamino, or PR¹_mCH₂OH groups or interrupted by one or more ether or carbonyl linkages, and

in formula (III) each v is 1 or 2, k is from 0 to 10 (e.g. from 1 to 10), x is the number of groups in the molecule having v=2 and X is a compatible anion of valency y such that the compound is water-soluble.

20

- 16. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 15 wherein X is selected from the group consisting of chloride, sulphate, phosphate, acetate and bromide.
- 25 17. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 15 or claim 16, wherein the alkyl-substituted phosphonium compound is tetrakis (hydroxymethyl) phosphonium sulphate.
- 30 18. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 15 or claim 16 wherein the alkyl-substituted



phosphonium compound is selected from a group consisting of tetrakis (hydroxymethyl) phosphonium chloride, tetrakis (hydroxymethyl) phosphonium acetate and tetrakis (hydroxymethyl) phosphonium phosphate.

- 19. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 15 in which the condensate is a condensate of tris(hydroxyorgano)phosphine with a nitrogen containing compound.
- 20. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 19 in which the nitrogen containing compound is selected from the group consisting of a C₁₋₂₀ alkylamine, dicyandiamide, thiouren and guanidine.
- 15 The use of a water-soluble biocide as an uncoupling agent as claimed in any one of claims 1 to 14 wherein the uncoupling agent comprises a compound selected from the group consisting of quaternary ammonium compounds; polymeric quaternary ammonium compounds; polymeric biguanide hydrochlorides; tris(hydroxymethyl)nitromethane; 20 4,4-dimethylozazolidine; phenoxypropanol; phenoxyethanol; acrolein; aldehydes; triazines; quaternary phosphonium compounds; 2-bromo-4-hydroxyacetophenone; carbamates; tertbuthylazine; tetrachloro-2,4,6-cyano-3-benzonitrile; thiazole and isothiazole derivatives; compounds with activated halogen groups; bis chloromethyl 25 sulphone, and methylene bis thiocyanate.
 - 22. The use of a water-soluble biocide as an uncoupling agent as claimed in any one of the preceding claims in which the water-soluble biocide is formulated with one or more of a surfactant; an antifoam; a scale inhibitor; a corrosion inhibitor; a biocide, a flocculant, a dewatering aid and a dispersant.



- 23. The use of a water-soluble biocide as an uncoupling agent as claimed in any one of the preceding claims wherein the aqueous system is a wastewater treatment plant used for the treatment of industrial or municipal effluent.
- 24. An uncoupling agent comprising one or more conventional, water-soluble, water treatment biocide(s) as claimed in any one of claims 15 to 21.
- 10 25. A method for controlling the growth of bacterial biomass in an aqueous system comprising adding to, or contacting with, the aqueous system an effective amount of an uncoupling agent which is a water-soluble biocide as defined in any one of claims 15 to 21.
- 15 26. A method as claimed in claim 25 in which the method comprises contacting an effective amount of a water-soluble biocide directly with the bacterial biomass.
- 27. A method as claimed in claim 25 or claim 26 in which the effective amount of the water-soluble biocide added to the aqueous system is up to 5000 mg/l.
 - 28. A method as claimed in claim 27 in which the effective amount of the water-soluble biocide added to the aqueous system is up to 3000 mg/l.
 - 29. A method as claimed in claim 28 in which the effective amount of the water-soluble biocide added to the aqueous system is up to 1000 mg/l.
- 30. A method as claimed in claim 29 in which the effective amount of the water-soluble biocide added to the aqueous system is from 0.005 mg/l to 500 mg/l.



- 31. A method as claimed in claim 30 in which the effective amount of the water-soluble biocide added to the aqueous system is from 0.01 mg/l to 300 mg/l.
- 5 32. A method as claimed in claim 31 in which the effective amount of the water-soluble biocide added to the aqueous system is from 0.05 mg/l to 100 mg/l.
- 33. A method as claimed in claim 32 in which the effective amount of the water-soluble biocide is from 0.1 mg/1 to 10mg/l.
 - 34. A method as claimed in claim 33 in which the effective amount of the water-soluble biocide added to the aqueous system is from 0.5 mg/l to 7.5mg/l.
 - 35. A method as claimed in claim 34 in which the effective amount of the water-soluble biocide added to the aqueous system is from 1mg/l to 5mg/l.
- 20 36. A method as claimed in claim 25 or claim 26 in which the effective amount of the water-soluble biocide added to the aqueous system is from 0.1 mg to 10000mg per gram of sludge solids in the aqueous system.
- 37. A method as claimed in claim 36 in which the effective amount of the water-soluble biocide added to the aqueous system is from 0.5 mg to 1000mg per gram of sludge solids in the aqueous system.
 - 38. A method as claimed in claim 37 in which the effective amount of the water-soluble blocide added to the aqueous system is from 1 mg to 500mg per gram of sludge solids in the aqueous system.

- 39. A method as claimed in claim 38 in which the effective amount of the water-soluble biocide added to the aqueous system is from 5mg to 100mg per gram of sludge solids in the aqueous system.
- 5 40. The use of a water-soluble biocide as an uncoupling agent substantially as described herein with reference to the accompanying examples.
- 41. An uncoupling agent comprising a conventional, water-soluble,
 10 water treatment biocide substantially as described herein with reference to
 the accompanying examples
- 42. A method of controlling the growth of a bacterial biomass in aqueous systems substantially as described herein with reference to the accompanying examples.

INTERNATIONAL SEARCH REPORT

Inte nal Application No PCT/GB2004/002656

CLASSIFICATION OF SUBJECT MATTER PC 7 C02F1/50 A01N A. CLASS A01N61/00 A01N57/34 According to International Patent Classification (IPC) or to both national classification and IPC B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 CO2F Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the International search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data, PAJ C. DOCUMENTS CONSIDERED TO BE RELEVANT Relevant to daim No. Citation of document, with indication, where appropriate, of the relevant passages 1-10 χ GB 1 221 550 A (HOECHST AG) 3 February 1971 (1971-02-03) example 2 EP 1 080 641 A (NALCO CHEMICAL CO) 11-17, X 7 March 2001 (2001-03-07) 21-39 paragraph '0023!; claim 15 WO 99/33345 A (JONES CHRISTOPHER RAYMOND ; 1-15,19X ALBRIGHT & WILSON UK LTD (GB); TALBOT ROBE) 8 July 1999 (1999-07-08) page 1, paragraph 2; claims 1,10 US 4 673 509 A (DAVIS KEITH P ET AL) 11 - 16, 18X 16 June 1987 (1987-06-16) column 1, line 22 - line 23; claim 4 Further documents are listed in the continuation of box C. Patent family members are listed in annex. Special categories of cited documents: *T* later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the "A" document defining the general state of the art which is not considered to be of particular relevance Invention "E" earlier document but published on or after the international "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone filing date °L¹ document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. document referring to an oral disclosure, use, exhibition or document published prior to the international filling date but later than the priority date claimed *&* document member of the same patent family Date of mailing of the international search report Date of the actual completion of the International search 17 4. 12. Ch 1 December 2004 Name and mailing address of the ISA Authorized officer Rucopean Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340–2040, Tx. 31 651 epo nl, Fax: (+31-70) 340–3016 Serra, R

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Form PCT/ISA/210 (second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

International application No. PCT/GB2004/002656

Box Ii Observations where certain claims were found unsearchable (Continuation of Item 2 of first sheet)
This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:
Ctalms Nos.: because they relate to subject matter not required to be searched by this Authority, namely:
Claims Nos.: because they relate to parts of the international Application that do not comply with the prescribed requirements to such an extent that no meaningful international Search can be carried out, specifically:
3. Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).
Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)
This international Searching Authority found multiple inventions in this international application, as follows:
see additional sheet
As all required additional search fees were timely paid by the applicant, this international Search Report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. X As only some of the required additional search fees were timely paid by the applicant, this international Search Report covers only those claims for which fees were paid, specifically claims Nos.: 11-39
4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
Remark on Protest The additional search fees were accompanied by the applicant's protest. X No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-10

use of a water soluble biocide in an amount up to 5000mg/l

2. claims: 11-39

use of a water soluble biocide in an amount depending on the quantity of sludge solids

3. claim: 40

use of a biocide

4. claim: 41

uncoupling agent comprising a biocide

5. claim: 42

method of controlling a biomass

INTERNATIONAL SEARCH REPORT

Int nal Application No PCT/GB2004/002656

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